

cancellation

consider floating point numbers with base $b = 10$ and mantissa length $t = 7$.

$$x = +0.123467 * \quad 7. \text{ digit perturbed}$$

$$y = -0.123456 * \quad 7. \text{ digit perturbed}$$

$$x + y = 0.000011*$$

representation of the result as a normalized floating point number, i.e.,

$$x + y = 0.11 * 0000 \cdot 10^{-4} \quad 3. \text{ digit is perturbed.}$$

A perturbation of the input data x, y in the 7. digit results in this example in a perturbation in the 3. digits of the sum $x + y$. This suggests a relative conditioning of $\kappa_{rel} \approx 10^4$. This is consistent with $\kappa_{rel} = \frac{|x|+|y|}{|x+y|} \approx 2 \cdot 10^4$.